

## Remarks

### Rejection Under 35 U.S.C. §112, Second Paragraph

Applicant respectfully submits that Applicant's amendment to Claim 10 overcomes the Examiner's rejection of Claim 10 under 35 U.S.C. §112, second paragraph. Applicant wishes to thank the Examiner for identifying this lack of antecedent basis.

### Rejection Under 35 U.S.C. §103 (a)

The Examiner rejected Claims 1, 6 and 13 under 35 U.S.C. §103 (a) as being unpatentable over Applicant's disclosure of admitted prior art in view of Bitners et al. (corresponding to FR '427) or Wu (3,885,928).

The Examiner stated that while not positively recited, obviously the formation of an aqueous phase above the feed tray is inhibited because the distillation column (corresponding to the heads column) of Bitners et al. operates in the manner as claimed in Claim 6. The Examiner referred specifically to column 1, lines 19-24 of Wu and to column 4, lines 13-64 of Bitners.

As stated by the Examiner, both Bitners et al. and Wu teach the use of a decanter attached to a column that is used to distill HCN during a process to purify acrylonitrile. In Bitners et al., the feed for such decanter is taken from a point at or below the middle of the column. In Wu, the feed for the decanter is taken from the bottom of the column. In each decanter, a lower aqueous phase or layer is separated from an organic phase or layer. In Wu, the separated aqueous layer is sent to the quench column. In Bitners, the aqueous phase is "run off."

However, Applicant respectfully submits that neither Bitners et al. nor Wu teaches or suggests Applicant's claimed invention. As claimed in Claim 1, Applicant's invention comprises, *inter alia*, operating the heads column in a manner which inhibits the formation of an aqueous phase above the feed tray of said heads column, also known as the HCN column. As described in Applicant's specification, HCN is taken as an overhead in the heads column. As also described in the specification, HCN is known to polymerize in the heads column.

Such polymer forms on the trays and internals in the heads column above the feed location. Such polymer fouls the trays, weirs and downcomers and disrupts the hydraulic balance in the heads column. The polymerization increases the column pressure drop, and the corresponding increased temperatures in the column further increases the polymer formation. The polymer eventually causes a costly and time-consuming shutdown and column cleaning.

Applicant's process, however, permits the operation of the heads column with lower rates of HCN polymerization and resulting fouling. Nothing in Bitners et al. or Wu teaches or suggests to one of skill in the art to operate the heads column in a manner that inhibits the formation of an aqueous phase above the feed tray of the heads column. Nothing in Bitners et al. or Wu teaches or suggests why one should inhibit the formation of an aqueous phase above the feed tray in the heads column. Nothing in either Bitners et al. or Wu teaches or suggests to one of skill in the art a method to reduce the formation of polymeric HCN in the heads column. Applicant respectfully submits therefore that Applicant's invention as claimed in Claim 1 and in dependent Claim 6, is not obvious in view of either Bitners et al. or Wu.

The Examiner rejected Claims 1, 2, 6, 9, 10, 12 and 13 under 35 U.S.C. §103 (a) as being unpatentable over Applicant's disclosure of admitted prior art in view of EP 0024788 and GB 2041372. The Examiner stated it would have been obvious to one of ordinary skill in the art to incorporate EP '788 and GB '372 processes to the process admitted to be known by Applicant inasmuch as EP '788 suggests at page 2, lines 11-14, "...the need for a column to remove water...for purifying the acrylonitrile...", and inasmuch as GB '372 suggests "...a small reflux ratio in condenser...becomes larger and accordingly, hydrogen cyanide is not enriched..."

Applicant respectfully submits that Applicant's invention as claimed in Claims 1, 2, 6, 9, 10 and 12 and is not obvious in view of EP '788 and GB '372, each either taken alone or taken in combination. Specifically, EP '788 discloses a process for the final purification of acrylonitrile. This patent publication relates primarily to the final distillation column in the acrylonitrile purification process.

EP '788 does not, for example, teach or suggest a process for operating a heads column in a manner which inhibits the formation of an aqueous phase above the feed tray of the heads column. Likewise, GB '372 does not, for example, teach or suggest a process of operating a heads column in a manner which inhibits the formation of an aqueous phase above the feed tray of the heads column. GB '372 relates to a process for reducing the cooling load for a condenser at the top of a distillation column for stripping hydrogen cyanide where refrigerated water can be replaced with cooling water of a higher temperature such as cooling water from a cooling tower. The Examiner is requested to refer to column 2, lines 1-10 of GB '372. In GB '372 a vapor is withdrawn from the column at a point between the top of the column and the point of introduction of the crude olefinically unsaturated nitrile, the withdrawn vapor is cooled and condensed, and the condensed liquid returned to the column at an intermediate point between the point of introduction of the crude olefinically unsaturated nitrile and the top of the column. However, nothing in the GB '372 patent publication teaches or suggests to one of skill in the art of inhibiting the formation of water above the feed tray in the heads column and nothing in the GB '372 patent publication teaches or suggests the inhibition of the formation of polymerized HCN in the heads column. Therefore, neither the EP '788 nor the GB '372 taken alone or in combination makes Applicant's invention as claimed in Claim 1 and Claims 2, 6, 9, 10 and 12 dependent thereon, obvious to one of skill in the art.

The Examiner rejected Claims 1, 7, 8, and 13 under 35 U.S.C. §103(a) as being unpatentable over Applicant's disclosure of admitted prior art in view of EP 0053578. As an initial matter Applicant believes that it was the Examiner's intention to cite EP 0053518, and not EP 0053578. The Examiner stated that the process of increasing the number of trays as claimed in Claim 7 is within the purview of one skilled in the art as suggested at page 3, lines 1 2 from the bottom of the EP '518 reference. The Examiner also directed Applicant to page 6, lines 9-11 of EP '518 with respect to Claim 8.

Applicant respectfully submits that Applicant's invention as claimed in Claims 1, 7 and 8 is not obvious in view of EP '518. EP '518 discloses a process

for purifying acrylonitrile by utilizing various sources of heat within the process disclosed therein. Nothing in the EP '518 teaches or suggests Applicant's invention comprising, *inter alia*, operating the heads column in a manner, which inhibits the formation of an aqueous phase above the feed tray of the heads column. Nothing contained in the EP '518 patent publication teaches or suggests the inhibition of the formation of polymeric HCN in the heads column. Applicant respectfully submits therefore that Applicant's claimed invention is not obvious in view of EP '518.

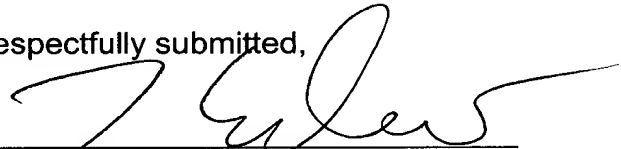
Applicant respectfully submits that the Examiner's rejections relating to Claim 13 are no longer pertinent in view of Applicant's cancellation of Claim 13.

Applicant wishes to point out to the Examiner that although Claim 11 is recorded as being rejected in the office action summary PTO Form 326 included with the instant office action, the Examiner has not provided any basis for the rejection of Claim 11.

In view of the amendments and remarks above, Applicant respectfully requests the Examiner to reconsider the rejections under 35 U.S.C. §112, second paragraph, and 35 U.S.C. §103 (a). Applicant respectfully submits that the instant application is presently in condition for allowance, and Applicant respectfully requests the Examiner to pass the instant application for allowance.

Correspondence Address:  
BP America Inc.  
Docket Clerk, BP Legal, M.C. 5East  
4101 Winfield Road  
Warrenville, Illinois 60555

Respectfully submitted,



Thomas E. Nemo  
Attorney for the Applicant  
Registration Number 33,982  
(630)821-2459

### Marked-Up Version of Amended Claims

#### In the Claims:

Kindly cancel Claim 13.

Please amend Claim 10 as follows:

10. (Once amended) The process of claim 1, wherein a feed stream enters the product column and wherein said operating manner of said heads column comprises cooling the feed stream [to said heads column] to a temperature that no aqueous phase forms above the feed tray.